

GENERATING NON-RAD EMISSIONS REPORTS

Purpose

This Meteorology and Air Quality Group (MAQ) procedure describes how to estimate emissions from regulated sources of non-radiological air emissions and report these emissions in the semi-annual emissions reports and the annual emission inventory submitted to the New Mexico Environment Department (NMED).

Scope

This procedure applies to individuals in the Meteorology and Air Quality Group (MAQ) assigned to the Reporting team or assigned as a subject matter expert for a source regulated under LANL's Title V operating permit.

In this procedure

This procedure addresses the following major topics:

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Signatures

Prepared by: _____ Margie Stockton, MAQ	Date: <u>2/14/05</u>
Approved by: _____ Terry Morgan, QA Officer	Date: <u>2/14/05</u>
Approved by: _____ Steve Story, Title V Implementation Project Leader	Date: <u>2/18/05</u>
Work authorized by: _____ Jean Dewart, MAQ Group Leader	Date: <u>2/22/05</u>

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General information about this procedure

Attachments There are no attachments to this procedure.

History of revision This table lists the revision history and effective dates of this procedure.

Revision	Date	Description Of Changes
0	12/22/03	New document.
1	2/22/05	Revised internal combustion emission calculation section, clarified semi-annual emission reporting, and minor editorial revisions throughout.

Who requires training to this procedure? The following personnel require training before implementing this procedure:

- MAQ personnel assigned to the Reporting team

Training method The training method for this procedure is “**self-study**” (reading) and is documented in accordance with the procedure for training (MAQ-024).

Prerequisites In addition to training to this procedure, familiarity with the following documents is also required :

- LANL’s Title V Operating Permit Application, dated Nov. 27, 2002, and any updates.
- LANL’s Title V Operating Permit issued by NMED, No. P-100, and any updates.

Definitions specific to this procedure None.

References The following documents are referenced in this procedure:

- MAQ-025, “Training”
- MAQ-309, “Chemical Procurement Tracking”
- Operating Permit #P-100, and any updates
- 2002 Title V Operating Permit Application dated Nov. 27, 2002, and updates

Background

Regulatory requirements for semi-annual emission reports

LANL submitted a revised Title V operating permit application on November 27, 2002. A final Title V operating permit was issued to LANL on April 30, 2004. The permit requires that LANL submit semi-annual reports to NMED documenting facility-wide emissions for the previous 6 months. The reporting periods are Jan 1 – June 30, and July 1 – December 31, and the reports must be submitted within 90 days of the end of each reporting period.

As specified in Section 4.1 of LANL's Operating Permit: "Reports of actual emissions from permitted sources included in Section 2 of this permit shall be submitted on a semiannual basis." Emissions of criteria pollutants (NO_x, SO_x, PM₁₀, PM_{2.5}, CO, and VOC) must be included, as well as speciated emissions of hazardous air pollutants (HAPs). Emission estimates for criteria pollutants shall not include fugitive emissions. Emission estimates for HAPs shall include fugitive emissions.

Regulatory requirements for annual emission inventory

LANL is subject to the annual emission inventory requirements outlined in 20.2.73 NMAC. The annual emission inventory must be submitted to NMED by April 1 of each year. LANL reports the following sources in the 20.2.73 NMAC annual emission inventory:

- Units with a 20.2.72 NMAC construction permit,
 - Units included in the Title V Operating Permit (P-100), that are not specifically listed as insignificant or trivial activities,
 - VOC and HAP emissions from R&D activities.
-

Emission sources included in the Emissions Reports

The emission sources included in the emission reports include the following:

- Asphalt plant
- Permitted beryllium operations
- Boilers and heaters
- Carpenter shops
- Facility-wide chemical use
- Degreasers
- Process-related internal combustion units
- Data Disintegrator
- TA-3 Power Plant boilers
- Rock crusher – retired June 2004
- Storage tanks (annual emission inventory only)

Background, continued

**Additional
sources
included in
emission
reports**

As new sources are brought on-line or existing sources are modified, they may need to be included in future emission reports. The reporting team and the subject matter experts review any permitting activities that took place during the previous 6 months to determine if any new sources need to be added to the emission reports.

Calculating emissions

Summary

The steps below outline the process for calculating emissions for each source using the calculation spreadsheets that have previously been prepared. Obtain the data for these spreadsheets as described in the next chapter (*Data needs and emission calculation methods for each source type*).

Steps to use the calculation spreadsheets

To use the emission calculation spreadsheets, perform the following steps:

Step	Action
1	Each reporting period, retrieve the emission calculation spreadsheets for each source for the previous reporting period from the "projects" drive <ul style="list-style-type: none"> for the annual emission inventory: Cleanair/Projects/Emission Inventory/Reporting Period YearX for the semi-annual emissions reports: Cleanair/Projects/Title V Implementation/Sources/
2	<ul style="list-style-type: none"> For the annual emission inventory, copy each calculation spreadsheet into a new subfolder for the current reporting period and rename each spreadsheet to clearly identify which reporting period it is for. For the semi-annual emission reports, each year is on a separate worksheet within the source spreadsheet so that 12-month rolling totals can be calculated across years. Create a new worksheet for each new reporting year.
3	Review the emission factors and assumptions included in these spreadsheets to ensure they are still valid and current.
4	Enter the operating data (fuel use, material throughput, etc.) obtained from the various operating groups, as described in the remainder of this chapter, into each spreadsheet to update the calculations for the current reporting period.
5	Obtain independent peer review by someone other than the person updating the spreadsheet to ensure the new operating data were entered correctly and that the formulas in the calculating cells in the spreadsheet are still correct. All hand-entered data requires 100% verification by an independent reviewer.
6	Print out each spreadsheet, obtain signature and date from the reviewer, and include in the records file.

Steps continued on next page.

Calculating emissions, continued

Step	Action
7	Store electronic files of the spreadsheets on the MAQ "projects" drive. The path to these directories is: <ul style="list-style-type: none">• For the annual emission inventory: Cleanair/Projects/Emission Inventory/EI Year/• For the semi-annual emission reports: Cleanair/Projects/Title V Implementation/Reports/
8	Upon completion of each emissions report, file hard copies of all spreadsheets and supporting documentation in the MAQ records room. Create a separate record series for each reporting period, along with sub-folders within each reporting period folder for each emission source type.

Data needs and emission calculation methods for each source type

Collecting source emissions data

This chapter describes how to collect the data needed to calculate emissions (see previous chapter) for each source type included in the emission reports. A brief description of the calculation methodology is also included. More detailed information on emission calculation methodology for each source type is included in the Title V Operating permit application dated November 27, 2002. For new sources, see the construction permit application for more information on emission calculation methodology.

Asphalt plant

Calculate emissions by obtaining the total tons of asphalt produced for the reporting period and multiplying by appropriate emission factors. Emission factors are from *AP-42, Section 11.1, Hot Mix Asphalt Plants, December 2000*, unless LANL-specific source test data is available.

$$\text{Emissions} = (\text{tons asphalt produced}) \times (\text{lb/ton Emission Factor})$$

Beryllium operations

Emissions from permitted beryllium operations at TA-3-141, TA-35-213, and TA-55 must be included in the emission reports (see Operating permit for specific operations permitted). Note – the TA-3-102 permit was cancelled in 2004. Due to the classified nature of some of the beryllium operations, emissions are based solely on the maximum amount of beryllium that can be processed or on the hours of operation. Written documentation (email) from the owner of each beryllium operation should be obtained documenting that the permit limit for the amount of beryllium processed or the hours of operation were not exceeded during the reporting period. If the amount of beryllium processed or the hours of operation are less than or equal to the permit limits, then the permitted emission limit for each beryllium operation is assumed to be the actual emissions.

Data needs and emission calculation methods for each source type, continued

TA-3 power plant boilers

Obtain records of natural gas use and fuel oil use for the reporting period from the Facility-Wide Fuel Use report and the Plant Quantity Report (monthly deliverables to MAQ from the site support contractor). Multiply the fuel use by the appropriate emission factors to calculate emissions for the reporting period. Use emission factors from *AP-42, Section 1.4, Natural Gas Combustion, July 1998*, and *AP-42, Section 1.3, Fuel Oil Combustion, September 1998*, unless manufacturer data, or LANL-specific source test data are available.

For the semi-annual Title V emission reports, report the total emissions for the entire plant (sum of all 3 boilers). For the 20.2.73 NMAC annual emission inventory, report emissions for each individual boiler.

Calculate the emissions as follows:

$$\text{Emissions} = (\text{Nat Gas Use} \times \text{Emission Factor}) + (\text{Fuel Oil Use} \times \text{Emission Factor})$$

Boilers -- background

Emissions from combustion of natural gas and fuel oil from permitted boilers must be included in the emissions reports. The basic approach is to multiply the fuel use for the reporting period by appropriate emission factors for each pollutant. Use emission factors from *AP-42, Section 1.4, Natural Gas Combustion, July 1998*, and *AP-42, Section 1.3, Fuel Oil Combustion, September 1998*, unless manufacturer data or LANL-specific source test data are available.

For the annual emission inventory, separate emission calculations are required for each permitted boiler that does not qualify as an insignificant activity under Title V (e.g., TA-16 boilers, TA-55 boilers, TA-21 boilers). Include a separate line item showing emissions for each boiler in the emission inventory.

For the semi-annual emissions reports required by the Title V operating permit, total emissions for all boilers (including insignificant units) must be calculated, summed, and compared to permitted emission limits for the small boiler category.

The data needs and calculation approach are similar for both emissions reports.

Data needs and emission calculation methods for each source type, continued

Boilers – data needs

The following data are needed

- Natural gas use for TA-55 boilers
- Natural gas use for TA-21 boilers
- Fuel oil use for TA-21 boilers
- Total LANL Natural Gas Demand reports for the reporting period

Boilers -- calculation methods

For the TA-55 and TA-21 boilers, obtain actual fuel use from the Facility-Wide Fuel Use and Plant Quantity Reports respectively. Multiply actual fuel use by the appropriate emissions factors to calculate emissions.

The other boilers included in the Operating Permit are not metered and therefore gas use must be estimated. Follow the steps below to estimate gas usage for these small boilers.

Steps to estimate gas usage for non-metered small boilers

To estimate gas usage for the non-metered small boilers, perform the following steps:

Step	Action
1	Obtain total monthly LANL gas demand records from Facility-Wide Fuel Use reports (generated by FWO-UI).
2	Subtract out gas use from all metered sources (TA-55, TA-21, and TA-3, etc.). The amount of gas remaining represents what was used in numerous non-metered small boilers, heaters, and other sources.
3	For the semi-annual emission report, multiply this unaccounted gas-use number (from Step 2) by the appropriate AP-42 emission factors for small boilers. Add in the calculated emissions from TA-21, and TA-55 boilers to obtain an estimate of total emissions for the reporting period for all small boilers. Compare these emissions to the permit limits for small boilers.
Steps 4-7 are specifically for estimating emissions from individual non-metered boilers for the annual emission inventory.	
4	Review the boiler database maintained by MAQ to determine the total design rating of all non-metered natural-gas fired boilers used for comfort heat.

Steps continued on next page.

Data needs and emission calculation methods for each source type, continued

Step	Action
5	Divide the total gas usage by small sources (from step 2) by the total design rating of all non-metered boilers (from step 4) to obtain an average gas usage per MMBTU rating.
6	Multiply this average gas use by each boiler's design rating to estimate the amount of fuel burned in each non-metered boiler included in the emission inventory.
7	Multiply each boiler's fuel use by the appropriate emission factors for each boiler. Report these emissions separately for each permitted boiler in the annual emission inventory.

Carpenter shops

Calculate emissions from the TA-3-38 carpenter shop and the TA-15-563 carpenter shop based on the hours of operation the cyclones ran during the reporting period. Obtain the hours of operations from the log book kept by the Carpenter Shop Foremen. Verify the cyclone exhaust rate. Multiply the hours of operation times the cyclone exhaust rate, times the emission factor for particulate matter (PM) from *AP-42, Section 10.4, Woodworking Waste Collection Operations, February 1980*. Assumed cyclone efficiencies are documented in the November 27, 2002 Operating Permit Application.

$$\text{Emissions} = (\text{Hrs Oper of Cyclone}) \times (\text{Cyclone Exhaust Rate ft}^3/\text{min}) \times (\text{PM EF gr/ft}^3) \times (\text{unit conversions to lb})$$

Chemical use - background

The use of regulated chemicals is evaluated and tracked as described in the procedure on "Chemical Tracking," MAQ-309. Additionally, the files on Chemical Use/Procurements in the Emission Inventory Records from the previous year should be reviewed prior to beginning the analysis. In most cases, the methodology for emissions reporting from chemical use is based on the conservative assumption that:

$$\text{Purchase} = \text{Use} = \text{Emissions}$$

Steps to estimate chemical emissions

To develop emission estimates from chemical use, perform the following steps:

Step	Action
1	Obtain chemical purchasing data for the reporting period of interest, as described in the procedure "Chemical Procurement Tracking," MAQ-309. For emissions reporting, all chemicals added to ChemLog during the reporting period are included in the analysis (e.g., "Container Add-Date" between 01/01/03 to 12/31/03).

Steps continued on next page.

Data needs and emission calculation methods for each source type, continued

Step	Action
2	Identify, label, and remove trivial activities, paints, and oils through electronic text searches. The list of trivial activities can be obtained from the NMED Air Quality Bureau.
3	Separate the chemicals into “pures” and “mixtures.” The pures have CAS numbers and mixtures do not.
4	Analyze the pures by electronically comparing the chemical data with the list of regulated HAPs and VOCs by either matching CAS numbers for pure chemicals or performing text searches for compound regulated chemicals (i.e., mercury compounds, antimony compounds, etc.).
5	<p>To analyze the mixtures:</p> <ul style="list-style-type: none"> Identify matches from previous years’ analysis of mixtures (link to MAQ MSDS database). Sort the list of remaining mixtures from largest quantity to smallest. Select the chemical with the largest total. Locate material data from commercial files, MSDSs, or other chemical references. Identify the constituents, the percent composition, and CAS numbers for constituents. Add this data to the electronic files, and to the MAQ MSDS database. Repeat above step until the time and effort for characterization of the next chemical outweighs the benefit (i.e., when the characterization of top-ranking mixtures fails to significantly reduce the total quantity of the unclassified materials) or until the chemical quantities have been characterized below a statutory threshold. Document the remaining total pounds as unclassified materials.
6	Sum each of the regulated HAPs and VOCs from both the pures and mixtures.
7	On a case-by-case basis, evaluate the large purchases of HAPs and VOCs (rule of thumb: anything over ½ ton). Contact the owner of the chemical and determine if and how it was used during the reporting period. Make determination of whether “purchasing=use=emissions” is a valid assumption. Develop alternate method for estimating emissions, if applicable, and document.
8	Document all process assumptions that were used when this procedure was followed. Document any steps that were not followed or other deviations from the specified process. The level of documentation should be sufficient to demonstrate compliance with the applicable regulation and to allow duplication of the process.

Data needs and emission calculation methods for each source type, continued

Degreasers

Calculate emissions from the degreasers using a mass balance approach. A web-based tool has been developed for the degreaser operators to enter data on the amount of solvent added and removed from each degreaser. The difference between the starting and ending volume in the tank, plus the difference between the amount of solvent added and the amount of solvent removed is assumed to be evaporative air emissions. The web tool calculates the emissions using this mass balance approach. The data can be accessed at the following website:

<http://www.airquality.lanl.gov/degreaser/login.cfm>

The general form of the equation is:

$$\text{Emissions} = ((\text{Starting volume in tank}) - (\text{Ending volume in tank})) + ((\text{Vol. added during period}) - (\text{Vol. removed during period})) \times \text{Specific Gravity of Solvent}$$

Internal combustion

Only process-related internal combustion units are included in the annual emissions report. Stationary and portable stand-by generators are considered insignificant or trivial emissions units and do not need to be included in this 20.2.73 NMAC emissions report.

However, to demonstrate that LANL's facility-wide emissions are below the Prevention of Significant Deterioration (PSD) major source thresholds, for the semi-annual emissions report under Title V, total emissions from the stationary stand-by generators and large portable generators must be included. Small portable generators are considered trivial activities and are not included.

For the TA-33 process generator, calculate emissions using emission factors from *AP-42 Section 3.4, Large Stationary Diesel Engines, October 1996*, and emission factors provided by the manufacturer. Obtain the kilowatt-hours the TA-33 generator operated from the logbook kept by the operators. Calculate emissions by multiplying the kilowatt-hours by the emission factor and converting to tons.

$$\text{Emissions} = (\text{kw-hr operated}) \times (\text{EF grams/kw-hr})$$

The MAQ SME for generators ensures that hour meter readings are logged twice per year for the stationary and large portable generators to determine compliance with Title V operating limits. These hour readings are also used to calculate semi-annual emissions. For each generator, calculate emissions by multiplying the size of the generator (in kilowatts) by the hours of operation, and by the appropriate AP-42 emission factor (in g/kw-hr) and convert to pounds. Sum the results for all stationary generators and report this value for the pool of generators on the semi-annual emissions report.

$$\text{Emissions} = (\text{size kw}) \times (\text{hr operated}) \times (\text{EF grams/kw-hr})$$

Data needs and emission calculation methods for each source type, continued

Data disintegrator

Calculate emissions from the data disintegrator by multiplying the amount of material shredded, by an emission factor provided by the manufacturer. Obtain the amount of material shredded during the reporting period from the operating group (through the site Support Contractor). The emission factors and assumptions on the control efficiency of the cyclone and baghouse are documented in the Construction Permit application dated June 24, 2003.

The emissions are calculated as follows:

$$\text{Emissions} = (\text{Boxes shredded}) \times (\text{lb/box}) \times (\text{Manf. Supplied EF}) \times ((100 - \text{Cyclone Eff.})/100) \times ((100 - \text{Baghouse Eff.})/100)$$

Rock crusher

The rock crusher permit was retired in 2004 and this source has been shut down. It is no longer included in the emissions reports.

Storage tanks

The annual emissions report under 20.2.73 NMAC must include emissions from the following tanks:

- Fuel Oil Tank 779(a) at TA-3 Power Plant
- Fuel Oil Tank TA-3-26 at TA-3 Power Plant
- A “Composite Tank” used to represent several mineral oil, scintillation oil, and dielectric oil tanks.

Calculate emissions using the latest EPA-approved TANKS Program. For the two fuel oil tanks, use the total amount of fuel oil burned (provided in the monthly Plant Quantities Reports) as input to the TANKS program.

For the “Composite Tank” use the total amount of mineral oil, scintillation oil, and dielectric oil purchased during the reporting period as input to the TANKS program. This information is available through the ChemLog database on Laboratory-wide chemical purchases. (See MAQ-309, Chemical Tracking). The other tank parameters for this composite tank are documented in the 2002 Emission Inventory Files.

Storage tank emissions do not need to be included in the semi-annual emissions reports required by the Title V operating permit. The storage tanks at LANL qualify as insignificant activities due to a regulatory change in the applicability of the New Source Performance Standards for Storage Tanks (40 CFR60, Subpart Kb).

Developing deliverable to NMED

Semi-annual emission reports

The semi-annual emission reports as required in the Operating Permit P-100 must be submitted to NMED by March 31, and September 28 of each year. Each report must document emissions for the previous 6 months. The report must include a comparison of actual emissions that occurred during the reporting period with the facility-wide allowable emission limits specified in Operating Permit P-100. The following steps must be completed before submittal:

- Technical peer review by Title V Implementation Team Leader, and other appropriate ENV-MAQ staff
 - Request for legal review by LANL Legal Counsel
 - Request for DOE review by local DOE staff
 - Classification review
 - Notarized signature by LANL Designated Responsible Official
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Annual emission inventory

The annual emission inventory required under 20.2.73 NMAC must be submitted by April 1 of each year. The report covers emissions for the previous calendar year. Emissions must be reported in a format provided by NMED. The emission inventory submittal includes other information in addition to actual emissions. The other information may include stack parameters, control equipment information, operating data, material throughput data, or other information requested by NMED. Each year NMED provides detailed instructions along with the requested format for the annual emission inventory submittal. Complete the same review steps as those listed above for the semi-annual emissions report, with the exception that the annual emission inventory is submitted under signature of the ENV Division Director.

MAQ responsibilities

Implementa- tion

The following table summarizes responsibilities of MAQ personnel in this procedure.

Who	What
Subject Matter Experts for each source type	<p>Obtaining operating data that is needed to calculate emissions.</p> <p>Maintaining current knowledge of any changes in operations or addition of new regulated emissions sources.</p> <p>Maintaining current knowledge of appropriate emission factors to use for calculating emissions. This includes:</p> <ul style="list-style-type: none"> • Awareness of updates to AP-42. • Awareness of LANL-specific source test data. • Awareness of manufacturer or vendor data on emissions for new or modified sources.
Reporting Team	<p>Completing all emission calculations for the semi-annual reporting required by the Title V Operating Permit, and the annual emission inventory reporting required under 20.2.73 NMAC.</p> <p>Calculating facility-wide total emissions and comparing them to Title V permit limits as part of the semi-annual emissions reporting requirements.</p> <p>Developing a submittal package summarizing the actual emissions for each reporting period and obtaining technical peer review, legal review, DOE review and classification review prior to submittal to NMED.</p> <p>Obtaining required reviews and signatures and submitting the emissions reports to NMED by the required date.</p> <p>Maintaining a record series documenting all emissions calculations</p>

Records resulting from this procedure

Records

The following records generated as a result of this procedure must be submitted to the records coordinator:

- Semi-annual emissions reports for Title V compliance.
- Annual emission inventory submitted to NMED under 20.2.73 NMAC requirements.
- Hard-copies of all peer-reviewed emission calculation spreadsheets and back-up operating data used as input documenting how emissions were calculated.

[Click here to record “self-study” training to this procedure.](#)